IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

PLANT IDENTIFICATION MODEL

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Abstract:

Global biodiversity is progressively declining. The current rate of extinction is greatly influenced by both direct and indirect human action. Future biodiversity protection depends on our ability to identify plants accurately and comprehend their spatial distribution. Therefore, the management and study of biodiversity depend heavily on the prompt and accurate identification of plants. Various plant features are used as identification keys by botanists throughout the manual identification procedure.
Then, in order to identify different plant species, these keys are gradually and adaptively analysed. By answering a series of questions about one or more characteristics of an unknown plant (such as shape, colour, number of petals, presence of thorns or hairs), an identification key user is essentially focusing on the most distinctive aspects and decreasing the number of features that the plant has in common.

Keywords: Identification, analysis, species, origins, leaves, classification, recognition.

I. Introduction:

It is vital to identify plant species in order to properly study and manage biodiversity. Under a manual identification technique, several plant features are evaluated as identification keys, which are then progressively and adaptively analysed to identify various plant species. Yet, the manual process is laborious and time-consuming. Thanks to recent technology breakthroughs, there is a need for more efficient methods to meet the needs of species identification. These techniques involve the development of algorithms for pattern recognition and image processing, for example.

II. Methodology:

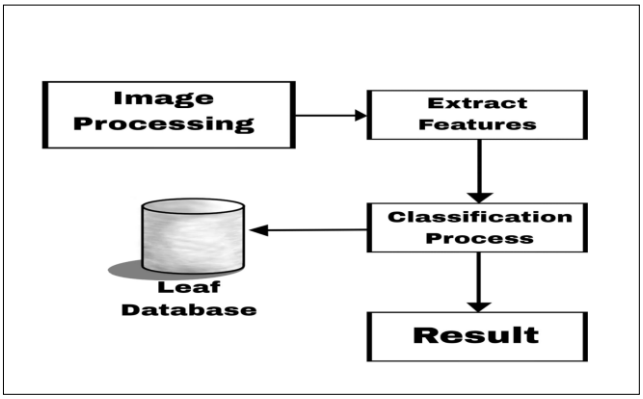


Figure 1: Systematic Block Diagram.

1.Data Collection: - Gather a sizable dataset of plant photos from a range of sources, such as internet databases, botanical gardens, and field photography.

- Make that a variety of plant species are included in the collection, with diverse sections including leaves, flowers, stems, and fruits captured under varied growth conditions and phases.

2.Data Preprocessing: - Label the photos appropriately, naming the species and other noteworthy characteristics.

- Clean up the data to get rid of duplicates, erroneous labels, and poor-quality pictures.
- To improve model resilience, augment the dataset using methods like rotation, scaling, and colour tweaks.

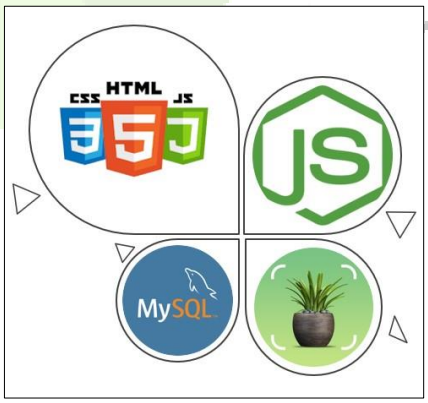
3.Model Selection: - Select a convolutional neural network (CNN) or other appropriate deep learning architecture for image identification.
- Take into account pre-trained models that have been optimized for the particular purpose of plant identification, such as VGG16, ResNet, or Inception.

4. Model Training: - To make sure the model's performance is accurately assessed, divide the dataset into training, validation, and test sets.
- Use the training set to train the model, optimizing it to reduce loss and boost accuracy.
- Use the validation set to validate the model and adjust the hyperparameters to avoid overfitting.

III. Software Integration:

Front-end programming languages are essential tools for using any kind of software or website. They are employed in the creation of website user interfaces. Therefore, designing user-friendly front-ends becomes crucial. Languages used - HTML, CSS, JAVASCRPT.

Software developers employ a back-end or server-side programming language to design a website's or mobile application's internal infrastructure. They are used by developers to create the server, database, APIs, and back-end logic of an application. Languages used
MYSQL.



IV. Hardware Integration:

The ESP32-CAM development board is a small, inexpensive board with an integrated camera. It's the ideal solution for do-it-yourself projects, Internet of Things applications, and prototype builds. The board integrates WiFi, traditional Bluetooth, low power BLE, and two potent 32-bit LX6 CPUs.

V. Applications:

The plant identification app gives users access to all available plant information, including common and scientific names, descriptions, origins, and the families and groupings to which they belong.

VI. Conclusion:

The continuous loss of biodiversity worldwide is mostly caused by direct and indirect human activity. It is essential to correctly identify plants and comprehend their distribution in order to counteract this trend. Plant species identification must be done accurately and promptly in order to maintain biodiversity effectively. In order to differentiate between species, botanists use a variety of plant traits as identification keys that are methodically examined. Users can help identify an unknown plant by providing precise answers to questions about its properties. This helps to focus on the plant's unique qualities and minimize the amount of shared characteristics. For the purpose of protecting and researching biodiversity, accurate plant identification is crucial.

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